



**Liquidity Management in EMEAP Money Markets:
Possible vulnerabilities and scope for cooperation**

— Special Report from the EMEAP Working Group on Financial Markets—*

July 2010

Disclaimer: This study covers the updated information on financial markets and policy actions in EMEAP jurisdictions until April 2010, and the charts and tables are based on the market data available between January 2007 and September 2009 (some tables are as of February 2010). Hence the study includes an assessment of developments since the Lehman Brothers bankruptcy, but does not take into account the current intensified European fiscal crisis since late April 2010.

* This report was compiled by the EMEAP Working Group on Financial Markets under the chairmanship of Mr. Akinari Horii, the former Assistant Governor of the Bank of Japan.



Executive summary

1. The adverse impact of the recent global financial crisis on EMEAP money markets was initially limited, but became rapidly more apparent, particularly in those economies with strong international linkages, such as through offshore funding and the operations of foreign banks. The contagion from the international strains has been contained as the region's authorities have swiftly introduced a variety of measures to provide sufficient liquidity and strengthen confidence in the market. The resilience of EMEAP financial systems has also been supported by i) limited direct exposures of local financial institutions to the troubled assets and financial instruments prevailing in the US and European markets; ii) abundant liquidity provision in local money markets; and iii) limited concern over counterparty credit risk given the dominant presence of central banks in money market transactions in some economies.
2. The survey finds potential vulnerabilities in the uneven distribution of reserve balances in many markets. The lower efficiency of the money market in distributing reserve balances, and the high concentration of transactions in short-term maturity in EMEAP money markets, can be largely attributed to the less developed mechanisms for mitigating counterparty credit risk, especially the underdevelopment of repo markets. With regard to the international distribution of liquidity, some markets are susceptible to developments in international financial markets, owing to their heavy reliance on offshore borrowing.
3. This uneven distribution of reserve balances coupled with limited market function for redistribution has been mitigated by central banks taking on the role of central counterparty. Such reliance on central banks increased during the peak period of the recent crisis. Although the authorities have made efforts to promote more market functioning through the development of repo markets, they have also had to deal with many other structural challenges, including the limited availability of risk-free financial instruments.
4. Most of the EMEAP central banks are confident that their liquidity management frameworks are sufficient to cope with possible stress in the money markets. Most member central banks did not observe stigma associated with their standing facilities. Their frameworks have been further strengthened by measures introduced since the Lehman Brothers bankruptcy to cope with the recent crisis. However, the scope for expanding liquidity provision tools may be limited, owing to an insufficient stock of financial assets. The use of FX swap markets as a substitute is not a perfect solution.
5. At the Special Workshop held in August 2008, participants recognized the importance of enhanced collective regional surveillance and information exchange. On the other hand, owing to the



limited cross-border presence of regional financial institutions and abundant foreign exchange reserves, there was no pressing need for a scheme to assist foreign currency liquidity management, such as swap arrangements among central banks. However, as tensions in the international financial market increased after September 2008, there was growing recognition of the need for enhancing USD liquidity management, even in the EMEAP region. Several member central banks arranged temporary swap facilities with the FRB to provide USD to their domestic counterparties in exchange for domestic currency collateral. Some central banks have considered introducing cross-border collateral to enhance their ability to provide liquidity. Nevertheless, it should be noted that many challenges remain with regard to the legal framework and practical issues, including settlement and risk management.

1. Introduction

The crisis in the global financial market grew in both scope and scale in 2008 and 2009. In dealing with the crisis, a key challenge for central banks was how to lessen strains in the money markets. Central banks in the US and Europe responded by making accommodative adjustments to their operations, followed by introducing some unconventional measures to stabilize money markets and complement their liquidity redistribution function. These measures included increases in the term and types of operations, the list of counterparties, eligible collateral, and also credit risk-taking in certain markets.¹

The impact of the recent global financial crisis on EMEAP money markets has been relatively limited. Nevertheless, greater strains surfaced in the region, especially in USD funding, between the failure of Lehman Brothers in mid-September 2008 and March 2009, reflecting both increased counterparty credit risk and deleveraging by financial institutions. It is therefore important to draw lessons from the experience of the US and Europe, and to examine i) potential vulnerabilities arising from the structure of money markets in the EMEAP region, ii) preparedness and scope for strengthening of central banks' liquidity management tools to address market strains, and iii) possible regional cooperation to cope with liquidity stress.

In early 2008, the EMEAP Working Group on Financial Markets (WGFM) initiated a fact-finding survey among member central banks on the structure of money markets and their liquidity

¹ The G10 Committee on the Global Financial System (CGFS) reviewed the policy responses made by US and European central banks up to spring 2008 in its report, "Central bank operations in response to the financial turmoil," to draw lessons about what actions central banks should take in times of market stress. Please refer to <http://bis.org/publ/cgfs31.htm> for details.



management frameworks in the region, followed by a special workshop in August 2008 to deepen the discussion on the findings of the survey. The assessment report on the issues mentioned above, based on a variety of sources and the findings of this project, was first submitted to EMEAP Deputies at the EMEAP Deputies'/MSFC meeting held in Jeju, Korea on December 1-2, 2008, when the global financial turmoil was still evolving in unpredictable ways. The aim of this report is to provide an updated assessment incorporating market data for the period between January 2007 and September 2009.

The structure of this report is as follows. The next section provides a tentative assessment of the impact of the global financial crisis on EMEAP money markets, and discusses factors that have helped mitigate aggravation of market strains. Section 3 reviews the structure of money markets in EMEAP economies, and assesses whether there are any potential vulnerabilities in the face of possible future shocks by examining domestic distribution of reserve balances and liquidity redistribution in the domestic and international markets. Section 4 discusses the effectiveness of EMEAP central banks' existing liquidity management tools under market stress situations, and the scope for strengthening these tools. More specifically, Section 4 focuses on the list of eligible collateral, range of counterparties, and potential stigma associated with the use of standing facilities. Section 5 discusses the scope for regional central bank cooperation, especially currency swap and cross-border collateral arrangements, in preparation for situations where international redistribution of liquidity is disrupted by financial market crisis.

2. EMEAP money markets in the recent global financial crisis

This section briefly reviews developments in EMEAP money markets during the recent global financial crisis, and discusses the background to the relatively limited strains observed.

2.1 Developments in EMEAP money markets since mid-2007

The adverse impact on EMEAP markets of the financial crisis in the US and European markets was relatively limited for the period from mid-2007 to mid-September 2008. Noticeable strains were only observed in Australia, Japan, Korea, and New Zealand. However, the wave of bail-outs and bankruptcies in the US and European financial sectors in autumn 2008 was the catalyst for significant liquidity tightening throughout the region, especially in USD, reflecting increased counterparty credit risk. Strains in this stage then spread to other markets, including Hong Kong and Singapore.

The adverse impact observed in the region pertains to spillovers in markets with strong international linkages. Growing strains have taken the form of i) increases in funding costs, ii) a reduction in liquidity and an increase in volatility, and iii) a tightening of the credit stance of financial institutions.



All of these were transmitted through linkages with money markets in the US and Europe via banks' cross-border fund raising activities.

Banking sectors in Australia, New Zealand, and Korea, have been significantly dependent on borrowing from offshore markets for their local credit extensions, partly reflecting their diversified funding channels. During the recent crisis, this funding structure has helped transmit strains from disruptions in the US and European markets. Significant easing in monetary policy in both Australia and New Zealand was partly offset by an increase in costs caused by the credit and liquidity tightening in their markets. Term funding costs for banks relative to government borrowing rates or the cash target rate in local currencies increased from August 2007, as indicated by the widening spreads of three-month bank bills over the overnight-indexed swap (OIS) in both economies. The spreads widened in August 2007 from around 10 bps, and hovered around 40 to 50 bps until September 2008, before temporarily increasing to over 100 bps in October-November 2008. At the same time, the FX swap markets became less liquid and the cost of offshore borrowing increased substantially.

In Korea, there was a significant increase in interest rates for term funding, such as the three-month CD rate, and in funding costs through FX swap transactions. In the o/n interbank market, where the bulk of interbank transactions is concentrated, the interest rate remained basically stable at around the policy target, although some fluctuations were observed reflecting front-loading of reserve requirements by banks.

In Japan, interest rates increased sharply on term instruments maturing beyond the year-end or the fiscal year-end, and the o/n rate was also exposed to upward pressure. Three-month spreads between yen LIBOR and OIS increased to around 50 to 60 bps in late 2008. This reflected banks' more cautious attitude towards liquidity management and counterparty credit risk, especially of foreign banks, as well as towards the transmission of strains via FX swap markets.

Nevertheless, the increase in short-term interest rates even in the economies above remained well below levels seen in the US and major European markets. Three-month spreads between LIBOR and OIS reached as much as around 350bps in the US and 250bps in the UK, respectively, in late 2008.

On the other hand, in Hong Kong and Singapore, the two international financial centers in the region, strains were more or less limited until September 2008. The robustness of domestic money markets in these two economies to developments in offshore markets in the initial stages of the turmoil could be partly explained by the net surplus of foreign asset positions held by their banking sectors. However, after mid-September 2008, funding costs also increased in these two markets, reflecting the escalation in counterparty credit risk and deleveraging by foreign financial institutions. Problems associated with the sale to retail investors of structured products linked to the Lehman Brothers (Minibonds), together with a bank run incident in Hong Kong, also undermined market sentiment and elevated sensitivity to counterparty credit risk.



Strains in domestic money markets were very limited in other ASEAN countries and China, where international linkages are limited. Yet, after the events of September 2008, there were increases in funding costs in some of these markets, especially in USD and in term transactions. The global USD liquidity shortage was reflected in the region by sharply higher costs of USD funding via the FX swap market. This resulted in negative implied domestic rates from FX swaps in some markets, including Indonesia and the Philippines. In Thailand, the onshore implied THB swap rate fell significantly from 3.46% in early September 2008 to a low of 1.21% at the end of the same month.

As with the authorities in the US and Europe, monetary authorities in the region introduced aggressive policy measures, both conventional and unconventional, to help ease tension in the financial markets, including a number of temporary ones, during the period between late September 2008 and early 2009 in particular. These aggressive measures helped restore confidence in the region's financial markets. The tightness in local money markets and the USD liquidity shortage eased significantly after March 2009. Three-month bank bills over the OIS in Australia and New Zealand fell back to around 10 and 30 bps, respectively, by September 2009, and liquidity in the FX swap markets recovered to pre-Lehman bankruptcy levels, with swap-implied interest rates returning close to normal levels.

2.2 Background to the relatively limited strains

Several factors contributed to keeping EMEAP money markets less vulnerable to the negative developments in the US and European financial markets.

First, Asia-Pacific banks had limited exposure to subprime-related assets and structured credit products, unlike US and some European counterparts. According to the BIS, in June 2007, the notional principal of synthetic CDOs held by banks headquartered in Asia, excluding Japan, accounted for a mere 0.1 percent of these banks' total assets, compared to about 40 percent of assets for G10 reporting banks combined.² Similarly, the vast majority of Asian banks did not sponsor CP conduits or follow the originate-to-distribute business model, unlike many international banks. Therefore, Asian banks did not face having to refinance the conduits' maturing short-term obligations that could no longer be rolled over after ABCP markets seized up.

Second, abundant liquidity in many EMEAP money markets helped mitigate the adverse impact of the turmoil, containing the expansion of strains in the region. The ample liquidity in the banking system was owing to large capital inflows, accumulated current account surpluses, and higher growth of domestic deposits in relation to bank lending. According to IMF statistics, deposits exceeded outstanding claims on private sectors across the region, with the exception of Australia, Korea, and New Zealand (Chart 1).³

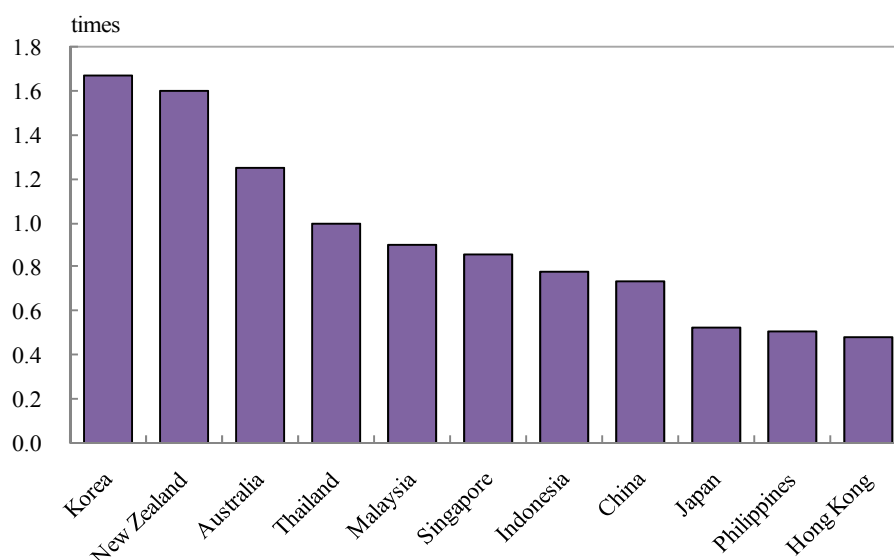
² Loretan, Mico, and Philip Wooldridge: "The development of money markets in Asia," *BIS Quarterly Review* (September 2008).

³ The share of deposits (excluding CDs) in Australian bank funding increased by 6 percentage points



Mopping up excess liquidity in the banking system was therefore the major challenge faced by many central banks in the region.

Chart 1. Private claims-to-deposit ratio in EMEAP economies (2008)



(Note) 2007 figure for the Philippines.

(Source) International Financial Statistics, IMF.

Third, in EMEAP money markets, where transactions vis-à-vis central banks are dominant, counterparty credit risk was less of a concern to market participants than in the US and European markets. Many EMEAP central banks that play the role of central counterparty absorbed excess liquidity from financial institutions, re-directing these funds to those in need of short-term funding. This situation, which may usually be a sign of market underdevelopment, served to add robustness against the heightening of counterparty credit risk during the recent crisis.

Last, EMEAP central banks have undertaken a variety of policy measures to provide sufficient liquidity and to restore confidence in the market. Measures taken by central banks to pump liquidity into their money markets include provision of abundant liquidity through money market operations in both domestic currency and in USD, accommodative adjustments to the range of eligible collateral and counterparties, improvement of access to standing facilities, and concerted actions and joint statements by central banks. The BOJ has also stepped in with unconventional measures to facilitate corporate financing, thereby ensuring the stability of financial markets. These measures will be discussed in more detail in Section 4. Precautionary financial system stability measures, such as deposit protection, were also taken in many economies, in collaboration with their respective governments.

from September 2007 to around 43% in September 2009, as banks continued to reduce their use of short-term market funding after the bankruptcy of Lehman Brothers in mid-September 2008.



These measures prevented the strains from international linkages expanding in EMEAP money markets.

3. Structure of EMEAP money markets: Potential vulnerabilities

Although the impact of the recent global financial crisis on EMEAP money markets was initially limited and subsided in a relatively short period, member central banks remain cautious over possible future shocks. For example, the buffer provided by ample liquidity in the financial markets could be drained if there is a reversal of capital inflows, which would likely result in a decline in aggregate reserves. After the failure of Lehman Brothers in mid-September 2008, the declining risk appetite of global investors accelerated the deleveraging and unwinding of investments out of the region, as was observed in particular in late 2008. In order to be prepared to cope with any possible market failures, this section reviews potential vulnerabilities in EMEAP money markets, with the focus on domestic distribution of reserve balances and the liquidity redistribution function of the markets.

3.1 Domestic distribution of reserve balances

Uneven distribution of reserve balances between large banks and small and medium-sized banks is observed in many EMEAP money markets. For instance, in China, there are significant differences in the size of commercial banks, and funds allocation is concentrated in favor of the major banks. Similarly, in Thailand and Indonesia, funds are concentrated in large banks, and in Singapore, slightly over half of reserve balances are concentrated in the three largest domestic banks.

Uneven distribution of reserve balances between domestic banks and foreign banks was also evident in EMEAP money markets, where foreign banks have a high presence as borrowers in the interbank call market, while only limited presence as lenders. The small deposit base of foreign banks encouraged them to raise funds in the local financial markets or to rely on offshore borrowing.

In Japan in particular, foreign banks' presence as borrowers in the call market was as large as 43.8 percent in 1Q 2007, before the financial crisis, while their presence as lenders was a mere 0.7 percent. Also in Korea and Indonesia, foreign banks' presence as borrowers in the call markets in 1Q 2007 was 48.3 percent and 34.9 percent, respectively, while as lenders they represented only 2.1 percent and 8.0 percent, respectively. This shows that foreign banks were largely dependent for their daily funding on the function of the interbank market to redistribute reserve balances, and were therefore vulnerable to any shocks that might result in a malfunctioning of the interbank markets. The vulnerability of foreign banks may easily transmit to the local financial market and poses a potential risk to the



region's financial system.⁴

This large presence of foreign banks as borrowers does not necessarily mean that foreign banks have a large presence in the local banking systems in terms of asset size. The total presence of foreign banks and foreign bank subsidiaries in the region remains relatively limited, at less than 16 percent in Australia, China, Indonesia, Japan, Philippines and Thailand, and less than 24 percent in Korea and Malaysia (Attachment 1).⁵ The exceptions are the two international financial centers, Hong Kong and Singapore, which are dominated by internationally active foreign banks, and New Zealand, where more than 90 percent of banking system assets are owned by subsidiaries of Australian banks.

3.2 Redistribution of reserve balances among market participants

Uneven distribution of reserve balances is not itself a problem as long as funds are efficiently redistributed in the money markets. In EMEAP economies, however, there are money markets where financial intermediation through the market is not sufficient, owing to inactive transactions or market segmentation. In markets where the function to redistribute reserve balances is less developed, this function is often supplemented by transactions with central banks.

One good example is Thailand, where money markets have been dominated by bilateral transactions with the central bank, with limited transactions among market participants. Although private repo and term interbank transactions increased in 2009, those transactions are still relatively small compared with BOT bilateral transactions.

Likewise, in the Philippines, 91 percent of total money market transactions in 2008 were dominated by those with the BSP. In Indonesia, uneven distribution of reserve balances is observed between systematically important banks and non-systematically important banks, but interbank transactions are limited, and most transactions are vis-à-vis BI, which acts as the central counterparty.

Another feature of the money markets in EMEAP economies is that the maturities of transactions are concentrated on the shorter side, in particular on o/n transactions (Table 1). High reliance on short-term debt increases vulnerability to liquidity risk, as well as raising concerns over the viability of

⁴ In the case of Japanese and Korean markets, foreign banks' presence as borrowers changed drastically after mid-2007 as the financial crisis evolved. In these markets, foreign bank's presence as borrowers declined to 6.8% and 11.9%, respectively, as of 3Q 2009, while their presence as lenders was still small at 2.0% and 11.9%, respectively.

⁵ In Malaysia, banks' foreign assets and liabilities are small and closely monitored by the authorities. On foreign banks operating in Malaysia, the Banking and Financial Institutions Act 1989 requires that all foreign banks be established as locally incorporated subsidiaries, which have their own independent capital, B/S, and management structures. Branches of foreign banks in Malaysia were established as International Islamic Banks under the Malaysia International Islamic Financial Centre (MIFC) initiative and are only allowed to transact in foreign currencies. These arrangements are considered to have helped the Malaysian banking system remain remote from instabilities in international financial markets.



the financial institution's longer-term funding.

In Korea, the reliance on o/n transactions in the interbank call market, the main money market, is particularly high at more than 90 percent. The BOK shifted its main policy rate from the o/n call rate to the seven-day repo rate in March 2008, aiming to mitigate this excessive concentration in o/n transactions, and also to boost transactions in domestic money markets in general. No significant change has been observed thus far in the maturity structure of the money market, but the measures are expected to assist in lengthening the term structure and to promote the development of repo transactions.

In New Zealand, the large banks raised the majority of their offshore funds in the US CP markets with a three-month maturity, and converted them into NZDs predominantly in the FX swap market with a corresponding tenure. This funding structure led to severe liquidity risk for banks in the recent global financial crisis. The RBNZ has recently announced a new "prudential liquidity policy," which will require banks to lengthen the maturity profile of their funding.

In Thailand, an increase in structural excess liquidity during the past few years has resulted in increased usage of the central bank's absorption tools, especially at very short-term tenures. The BOT deemed that a large volume of o/n transactions could pose a risk to banks' operations and undermined the long-term objective of market development. Hence, the BOT has attempted to lengthen its absorption portfolio duration by strategically increasing the volume of term bilateral repo transactions with primary dealers. This has led to an increase in term money market transactions. As a result, the most traded maturities in Thai money markets have shifted from o/n to 2 days – 1 week tenures.⁶ However, 90 percent of outstanding money market transactions are still concentrated in the up-to-1 month tenure. The BOT has also established a contingency plan to mitigate possible risks to banks' operations triggered by excess concentration in o/n transactions.

Table 1. Main maturity structure of banks' money market transactions

Australia	China	HK	Indonesia	Japan	Korea	Malaysia	Philippines	Thailand
3-6 months (66%)	o/n (75%)	Within a month (70%)	o/n (78%)	o/n (30%)	o/n (91%)	o/n (79%)	o/n (55%)	2 days-1 week (41%)

(Note) Figures in parentheses are the three-month averages for July to September 2009, based on data provided by the WGFM. Some are estimated figures.

In a market where transactions among market participants are inactive and their maturity structure is concentrated in o/n and shorter tenures, interest rates are highly exposed to large fluctuations when a sudden uneven distribution of reserve balances occurs. In China, for example, firms are required to

⁶ For the period under review, the share of o/n transactions in Thailand decreased drastically from its peak of 77% in 4Q 2007 to 15% in 3Q 2009 in private repo and interbank markets. The share of 2 days – 1 week transactions, meanwhile, increased from 3% to 41%.



deposit a specified amount in a designated financial institution when conducting an IPO. This creates a large demand for liquidity, which often results in a sudden increase in market interest rates reflecting the limited market function in redistributing reserve balances.

3.3 Underdeveloped repo markets

EMEAP countries should move to further develop their repo markets and reduce the concentration of transactions in short-term maturity to enhance mechanisms for the mitigation of counterparty credit risk and to support better functioning of the market in redistributing reserve balances.

Although repo markets have developed rapidly over the past couple of years, they still do not play a major role in most EMEAP money markets. In Korea, for example, the repo market was 22 times larger at the end of September 2009 than it was in 1990, and has become the second-largest market segment after CD markets. Nevertheless, financial institutions still transact most actively in the interbank call market. In Malaysia, 89 percent of money market transactions in 2009 were concentrated in other interbank transactions such as uncollateralized interbank borrowing and lending, and in BNM securities. In Indonesia, most interbank transactions are conducted in the call market, and repo transactions represent only 5 percent of total interbank transactions.

In Thailand, private repo transactions represented merely 14 percent of total market transactions in 4Q 2009, and banks mainly transact in FX swap markets. In the Philippines, the volume of repo transactions is insignificant. In New Zealand, while the authorities are encouraging transactions in the interbank repo market, with a modest increase in turnover, financial institutions remain mostly dependent on FX swap market transactions. Financial institutions in Hong Kong trade mainly in the interbank call market and FX swap market, while in Singapore, the FX swap market is the most liquid and deepest market, leaving the domestic repo market relatively underdeveloped.

There are several reasons for the underdevelopment of repo markets in the region. First, in some economies, such as Thailand, there is a lack of risk-free financial instruments owing to the small amount outstanding of government securities, which in turn derives from a relatively healthy fiscal balance.⁷ In addition, there are limited risk-free financial instruments traded in the secondary markets of those economies, owing to the hold-to-maturity strategy of institutional investors and end-investors. In Singapore, even though there has been no need to issue government securities owing to its history of balanced budgets, the MAS has been encouraging the government to issue securities to foster development of the local currency bond market and to provide sufficient collateral for banks' regulatory and liquidity requirements. In Hong Kong, the Exchange Fund Bills and Notes have been issued to facilitate the development of the bond market. Nevertheless, the repo market has

⁷ Most governments in the region introduced expansionary fiscal measures in 2008 and 2009 in order to support their economies in the midst of the global financial and economic downturn triggered by the recent financial crisis. Government debt is therefore expected to increase in most economies in the region.



been slow to develop given the presence of efficient interbank money and swap markets.

Second, in economies where money markets have been operating under abundant liquidity for many years, such as in Korea, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, there has been little need for market participants to adjust their money requirements by lending and borrowing among themselves, and thus, little demand has been created for the development of repo markets.

While this is a “chicken-and-egg” situation, in economies where central banks have undertaken the role of central counterparty, including Indonesia, the Philippines, and Thailand, financial institutions were less motivated to transact in the money market. However, in Thailand, the BOT abolished in February 2008 its BOT-operated repo under which the BOT undertook the role of central counterparty vis-à-vis all market participants, and shifted to a liquidity management scheme under which the BOT conducts repo operations with primary dealers only. This shift in policy and continued effort to develop financial markets has stimulated market transactions, with the volume of interbank repo transactions increasing by about twenty-six times between February 2008 and December 2009. However, their volume remains fairly low compared to that of market transactions overall.

Third, the lack of appropriate risk management in the region may be another impediment to the development of repo markets. In Korea and Thailand, for example, the development of repo markets has been impeded by the ability of financial institutions to borrow in uncollateralized call markets at a rate no higher than in the repo market. This suggests that financial institutions are not particularly concerned by counterparty credit risk. In Thailand, in December 2008, two thirds of money market transactions were in the form of uncollateralized transactions and buy/sell back transactions, where risk management does not require margin calls and marking to market. On the other hand, in Indonesia, when financial institutions conduct repos with each other, especially classic repos, lenders behave at times as if such transactions were not truly secured, as they reportedly impose unusually strict credit limits on their counterparties.⁸ This may be due in part to settlement risk, but may also stem from untested legal frameworks or master agreements that fail to provide certainty about which counterparty owns the collateral in the event of default.

Fourth, restrictions on short selling of securities also inhibit repo market activity. In well-developed markets, it is common for financial institutions to position for changes in interest rates by first borrowing securities in the repo market and then selling them. Restrictions on short selling have gradually been eased, but in many Asia-Pacific economies there are still limits on the types of institutions that are allowed to short sell securities, as well as outright prohibitions on the short selling of securities which the institution has not yet borrowed.

⁸ Recently, the banking sector in Indonesia mostly uses sell and buyback repos, whereas non-bank financial institutions (NBFI) mostly use classic repos.



Authorities are expected to foster the growth of repo markets by developing government bond markets, introducing tax reforms that can reduce transaction costs, and promoting the introduction of master repo agreements to mitigate transaction costs and legal risks. For example, the introduction of a repo market in Japan was hampered by the existence of the securities transaction tax. Repo transactions were initially introduced in 1989, as a form of securities lending with cash collateral, which was not subject to the tax. Yet, the regulation on interest rates on cash collateral impeded the expansion of repo transactions until 1996, when the regulation was lifted, and master agreements for repo transactions with cash collateral were introduced. In 1997, the BOJ began open market operations in the repo market. In 1999, the securities transaction tax was also abolished, and in 2001, repo transactions in the form of “sales” and “repurchase” were finally introduced in Japan.

EMEAP economies have been making efforts on this front. The BSP reduced the reserve requirement ratio applicable to the cash collateral for repo transactions from 21 percent to 2 percent in August 2004, in order to assist the development of the repo market.⁹ Likewise, the BOT has encouraged markets to use standard Global Master Repurchase Agreements (GMRAs), in place of buy/sell back transactions that do not require margin calls and marking to market, as well as educating market participants. Consequently, the share of repo transactions in the form of buy/sell back transactions decreased from 26% in December 2008 to 11% in December 2009. In addition, the BOT has been successful in coordinating with Thailand Securities Deposit to develop collateral management services, and with the tax authorities to reduce the Special Business Tax imposed on repo transactions since January 2008. BI has also been promoting the signing of master repo agreements to financial institutions. In China, repo market turnover has grown rapidly – more than 1,600 times since its inception in 1997 – and now represents 79% of total interbank money market transactions, including interbank borrowing and lending, and repos.

⁹ However, cash collateral for repo transactions is still subject to a 19% reserve requirement unless they are coursed through the Philippines Dealing Exchange (PDEX), the entity that provides infrastructure for repo transactions in the Philippines. Moreover, concerns remain regarding the rules for repo transactions, including the ownership, fees, and credit exposures to PDEX, and withholding tax also remains a problem, and discussions are underway with market participants on what can be done in the current situation.



3.4 FX swap markets

In some economies where repo markets are underdeveloped, financial institutions actively trade in FX swap markets, which also helps mitigate counterparty credit risk. In the Philippines, for example, FX swap transactions have grown rapidly in recent years because they are not subject to withholding tax, while being secured by USD cash collateral, and because the liquidity of the market is higher than in other money market segments. In Thailand, where the interbank repo market is still in its initial stage of development, about 87 percent of outstanding market transactions in 2009 were made in FX swap markets.

Meanwhile, in New Zealand, where the domestic securities market is small, financial institutions' reliance on the FX swap markets is very high. They usually raise a proportion of term funding abroad, in particular in the US CP market, and convert it into NZD via the FX swap market. They also conduct o/n and tomorrow/next (t/n) transactions in FX swap markets for their daily liquidity management. In Singapore, reflecting its status as an international financial center, the USD/SGD FX swap market is the most actively traded, liquid and deep market, followed by the interbank call market. Hong Kong also has a very liquid FX swap market, in which financial institutions' transactions are as active as in the interbank call market.

Nevertheless, FX swap markets cannot completely substitute for demand for repo markets in EMEAP economies. First, depending on the currency pair, time differences can present a major challenge to the settlement of foreign currency transactions. Currently, in settling FX swap transactions in the EMEAP region, local currencies are settled in the account of the central bank, while foreign currency transactions, mostly in USD, are settled in the account of a private clearing bank on a payment-versus-payment (PVP) basis. This enables banks to avoid Herstatt risk associated with the time difference of settlements, but in turn exposes them to the credit risk of the private clearing bank. Yet, there are some merits in utilizing a private clearing bank if FX swap transactions are conducted among banks with low credit ratings, in that, settlement at a private clearing bank with a higher credit rating can mitigate the credit risk, while settlement in the same time zone is also possible. However, the credit risk problem remains, and will be especially heightened in times of financial stress.

An alternative option is to use the CLS Bank, which offers a simultaneous settlement system for different currencies. However, the number of Asian currencies accepted is still limited,¹⁰ and there are some problems associated with the cost and cut-off time. Besides, FX swap markets are still small in some regional economies. In the Philippines, where FX swap market transactions represent a substantial portion of interbank transactions, not all banks possess sufficient amounts of USD or

¹⁰ The range of eligible currencies is currently limited to Japanese yen, Australian dollar, New Zealand dollar, Singapore dollar, Hong Kong dollar, and Korean won.

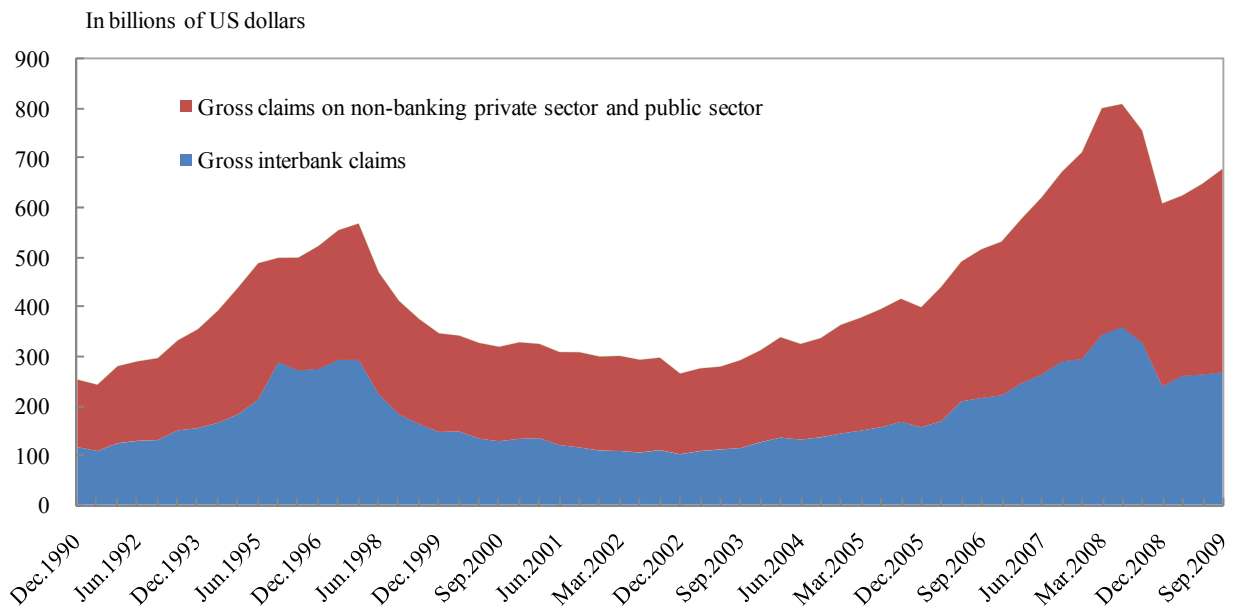


Philippines peso to participate in the FX swap market, and the number of participants in the market is limited.¹¹ As a result, the implied peso rate can become volatile.

3.5 International redistribution of liquidity

While the global linkage of financial institutions enables international redistribution of liquidity, it also carries the risk of transmitting strains. The unwinding of offshore borrowing is the main channel for transmitting strains from international linkage. BIS banking statistics show that offshore borrowing in EMEAP economies has increased sharply since 2002, and in 2007 already exceeded levels prior to the Asian financial crisis of 1997. The effect of rapid unwinding of offshore borrowing in late 2008 was severe but short-lived for EMEAP economies, as they have been quick to return to a growth trend since March 2009 (Chart 2). This was mostly because of the resilience of the EMEAP financial system and economies to the recent crisis. However, the sudden unwinding of offshore borrowing remains a potential risk.

Chart 2. Claims of BIS reporting banks vis-à-vis Asian economies



(Note) 1. China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand.
2. Cross-border claims and local claims denominated in foreign currency.

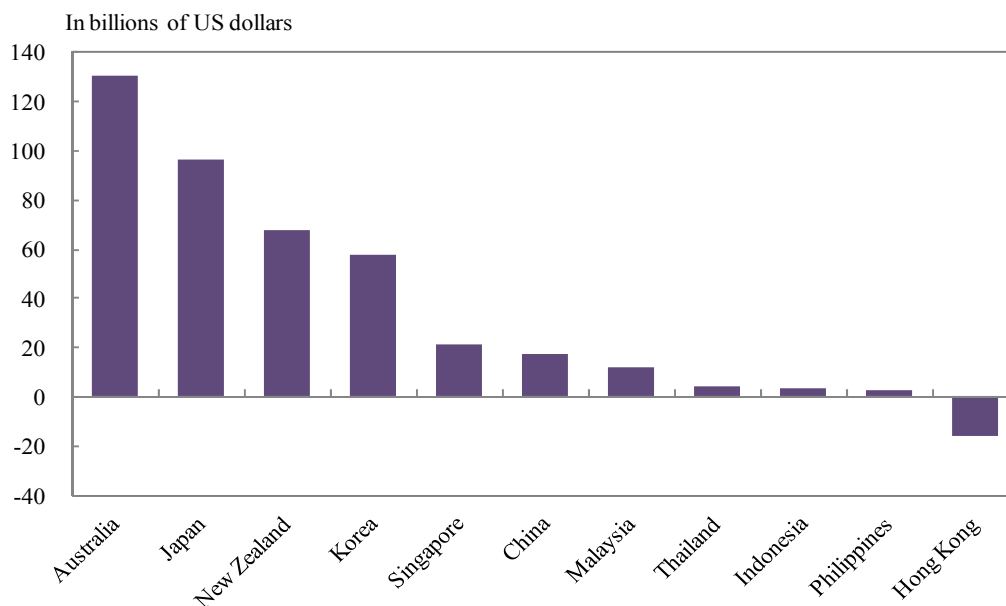
(Source) McCauley, R. E., and Jens Zunker: "Asian banks and the international interbank market," *BIS Quarterly Review* (June 2008).

Net local claims in local currency of foreign banks' on-balance sheets have been large, particularly in Australia, Japan, Korea, and New Zealand. This indicates that foreign banks have been lending in the local markets by relying heavily on offshore borrowing (Chart 3).

¹¹ Interbank transactions pertain to money market transactions excluding the BSP.



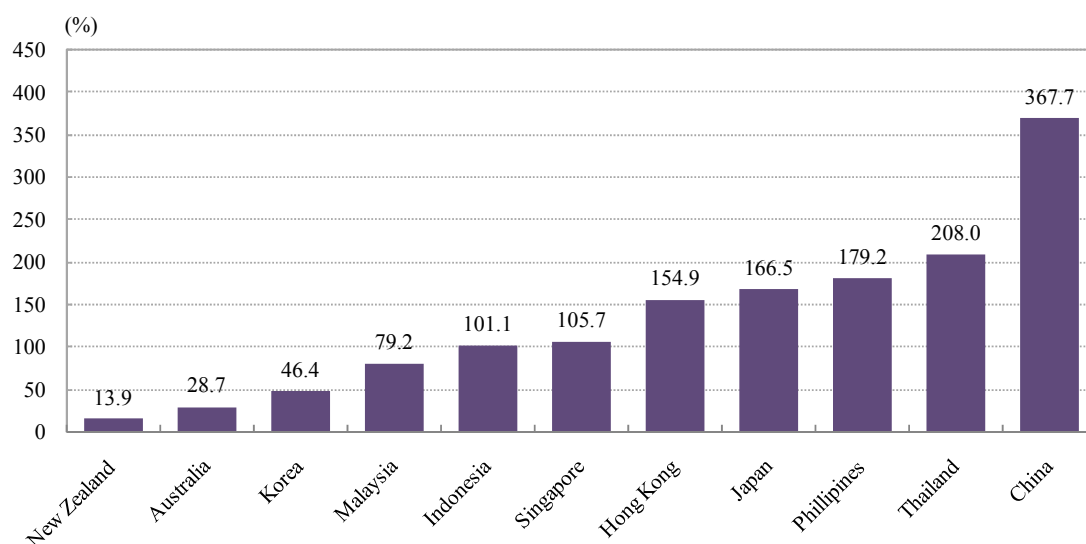
Chart 3. Net local claims in local currencies held by BIS reporting banks (2008)



(Note) Position of foreign banks' local affiliates denominated in local currencies vis-à-vis local residents: 2008 average of claims minus liabilities.

(Source) McCauley, R. E., and Jens Zikunft: "Asian banks and the international interbank market," *BIS Quarterly Review* (June 2008)

Chart 4. Banking sector's foreign assets coverage over foreign liabilities (2008)



(Note) 2008 average. Figures do not reflect the effects of hedging activities by banks.

(Source) International Financial Statistics, IMF

The banking sector's foreign assets coverage of foreign liabilities is particularly low in Australia, Korea, and New Zealand, at 28.7 percent, 46.4 percent, and 13.9 percent, respectively (Chart 4). In some countries, this exposure may be mitigated by hedging activities. In the case of



Australian banks, for example, this means that the foreign currency exposure due to any gap between foreign assets and liabilities on the balance sheet is largely offset by offsetting exposures in the derivative markets.¹² In other EMEAP economies, including the two international financial centers, the banking sector's dependence on offshore borrowing is relatively low, which is perhaps why Hong Kong and Singapore remained comparatively free from contagion from the recent global financial crisis until September 2008.¹³

The funding structure of banks in Australia, Korea, and New Zealand, made them especially susceptible to disruptions in offshore markets during the recent global financial turmoil. In New Zealand, funds equivalent to approximately 40 percent of banking sector assets were borrowed from abroad in 2008, mainly in USD, while banks in Australia also depend on offshore foreign currency bond issuance for about 25 percent of their funding. Throughout the recent financial turmoil, however, Australian banks have continued to access offshore funding, although offshore bond issuance temporarily dried up in December 2008. This is largely a reflection of relatively strong financial positions and government guarantees for selected bond issuance. In Korea, while domestic banks have reduced their net external position and shifted to domestic financing since mid-2007, foreign banks' branches have continued to increase their reliance on offshore short-term borrowing. In late 2008, foreign banks' branches in Korea still relied on offshore borrowing, especially from their head offices, for about 30 percent of their assets. This was motivated by their active participation in arbitrage transactions between the currency swap market and the Korean government securities market, where they could earn risk-free return. But since the USD funding environment for these banks' head offices abroad deteriorated, the unwinding of such positions added severity to the USD shortage in the Korean money markets, as well as the sharp depreciation of the Korean won and increase in Korean bond yields in late 2008 (See BOX 1 for details).

Meanwhile, banks' intra-group international funds transfers could provide a safety net in an emergency situation. In New Zealand, for example, where Australian banks' subsidiaries dominate the banking system, there was less impact observed through this channel in the turmoil, since Australian banks did not hold large exposures to subprime-related assets. On the contrary, there was reportedly liquidity support from parent banks to New Zealand subsidiaries when liquidity became tight in the local market.

However, this international redistribution of liquidity could be compromised if there are foreign exchange and capital controls in place. In the EMEAP region, the PBC, BI, BOK, BNM, BSP and BOT maintain some foreign exchange and capital controls, but all authorities have reported that

¹² Please refer to <http://www.rba.gov.au/publications/bulletin/2009/dec/1.html>.

¹³ In Thailand, foreign banks' branches held 13 percent of total banking sector assets, and offshore borrowing represented less than 9 percent of total liabilities as of the end of September 2009. In the Philippines, for the same period, there were 17 foreign banks' branches and local subsidiaries out of a total of 797 banks in the country, representing 11 percent of total banking sector assets.



there are no measures that would impede smooth emergency liquidity support from abroad in an emergency situation (Table 2).

Table 2. Foreign exchange and capital controls in EMEAP economies

PBC	DC	RMB funding from abroad is not available
	FC	Overseas borrowing and bond issues of domestic banks are subject to Chinese authorities' administration (i.e., quota limit).
BI	DC /FC	IDR transfer abroad is prohibited as a consequence of non-internationalization policy of IDR. Banks can not lend DC and FC to non-residents (NRs) except for credit card, consumer credit used domestically, intraday overdraft supported by the same day incoming transfer documents, and syndicated loans by offshore banks. NRs FC purchase against IDR in spot exceeding USD100,000 require underlying documents. However, FC funds from the controlling share holders to resolve liquidity difficulties are not restricted.
	BOK	FC
BNM	DC	Resident companies are free to obtain any amount of ringgit loans from their non-resident non-bank parent companies to finance investments in the real sector in Malaysia. Resident companies/individuals are also free to obtain up to MYR1 million from other non-resident non-bank companies or individuals for use in Malaysia. Non-residents are free to borrow any amount of ringgit from residents to finance investments in the real sector in Malaysia.
	FC	Malaysian-domiciled domestic and foreign banks have unrestricted access to foreign currency financing. Resident companies are free to borrow any amount of foreign currency from their non-resident non-bank parent companies, other resident within the same corporate group and onshore banks. Foreign currency financing from other non-residents is limited to an aggregate of MYR100 million equivalent on a corporate group basis. Resident individuals are limited to an aggregate borrowing of MYR10 million equivalent.
BSP	DC	Any cross-border transfer exceeding PHP10,000 requires prior authorization from the BSP. Banks should maintain a 100% cover for FC liabilities.
	FC	Banks may avail of short-term FC loans for normal interbank transactions without prior BSP approval. Banks should maintain FX assets to cover 100% of FC liabilities. Any person who brings in or takes out of the Philippines, foreign currency, as well as other foreign currency-denominated bearer monetary instruments, in excess of USD10,000 or its equivalent, is required to declare the same in writing and to furnish information on the source and purpose of the transport of such currency or monetary instrument.
BOT	DC	FIs can borrow from NRs under the following conditions: i) for transactions w/out underlying trade or investment in Thailand, total amount should not exceed THB10 million per group of NRs, ii) for transactions with underlying trade or investment in Thailand, transaction should not exceed the underlying transaction value.
	FC	FIs can bring in FC for liquidity purpose without any limits. But FIs shall maintain a net FX open position in each currency below 15% of capital or USD5 million, whichever is the greater, and an aggregate FX position not exceeding 20% of capital or USD10 million, whichever is the greater.

(Note) DC: domestic currency, FC: foreign currency.

It should be noted, however, that some restrictions for the purpose of prudential regulations and restrictions on the objectives of funds transfers could also have a adverse impact.¹⁴ For instance, the Chinese authorities maintained limits on offshore short-term borrowing for all domestic banks and foreign banks' branches to dampen the inflow of hot money and curb asset price inflation.¹⁵ As

¹⁴ In Singapore, domestic currency lending to non-resident financial institutions is limited to SGD 5 million.

¹⁵ The Chinese authorities announced a revision of their foreign exchange administrative ordinance on August 5, 2008, which took effect immediately. They have strengthened the examination of current account transactions and administrations on the objectives of capital account transactions, in order to manage capital inflows. Regarding capital account transactions, some authorization processes for external investments were simplified, and administration principles were clarified regarding i) fund



discussed earlier, the function of China's money markets in redistributing domestic reserve balances has room for improvement, and thus, funds transfers from head offices abroad are an important source of funding for foreign banks that do not have a strong local deposit base, though this channel has been limited by these regulations.

In Korea, the authorities introduced the "real demand principle" to foreign exchange borrowing for domestic banks in July 2007, reflecting the rapid expansion of short-term external debt in the banking sector, and in January 2008, they also brought down the ratio for the recognition of interest payments on foreign bank branches' borrowing from their head offices as an expense for tax deduction from six times capital to three times. The latter measure was relaxed back up again to six times a branch's allocated capital in August 2008, following the sharp depreciation of the Korean won and rising difficulties in USD funding for foreign banks. However, this regulatory gap between domestic banks and foreign bank branches with respect to offshore borrowing might have contributed to the distortion of the currency swap market and provided arbitrage opportunities to foreign banks (see Box 1).

4. Liquidity management framework in EMEAP economies

Central banks helped to mitigate disruptions in money markets and stabilize market interest rates, so that financial institutions could conduct liquidity management smoothly. The CGFS report made a tentative review of how G10 central banks responded to the financial market crisis originating in the US and European markets up to spring 2008. The report also pointed out that when the function of money markets to redistribute reserve balances is compromised, it is important for central banks to enhance their own ability to provide liquidity by expanding the range of both eligible collateral and eligible counterparties for their market operations, and to complement market functions. It was also noted that stigma associated with the use of standing facilities can impact on the effectiveness of central banks' liquidity management.

This section reviews EMEAP central banks' liquidity management frameworks focusing on i) major tools, instruments, and eligible collateral for their liquidity management measures, ii) financial institutions' access to central bank money, and iii) the existence of stigma associated with the use of standing facilities. It also examines the effectiveness of the current liquidity management tools in a stress situation and the scope for their expansion.

4.1 Money market operations framework

Many EMEAP central banks identify money market interest rates as their operational targets.

raising activities by non-residents in China, ii) external portfolio investments and derivatives transactions by residents, and iii) foreign commercial lending by residents.



The PBC targets the amount of excess reserves, and uses the one-year lending rate and deposit rate as its main policy rates. The HKMA and MAS have adopted foreign exchange rates as their anchor. The HKMA has adopted the currency board system, whereas the MAS manages the trade-weighted nominal effective exchange rate against a basket of currencies (Attachment 2).

Among central banks that target money market interest rates, the BOK is currently the only central bank that does not use the o/n rate as its main policy rate, using the one-week rate instead. The BOK used the o/n rate as its main target until March 2008, but decided to introduce the current one-week repo rate in order to mitigate the excessive concentration of interbank transactions in the o/n term. This is expected to contribute to extending the tenure of transactions as well as fostering the development of the domestic repo market.

In contrast to the BOK's move, BI shifted its operational target in June 2008, from the one-month SBI (central bank securities) rate to the o/n rate, so as to reduce high interest rate volatility in the o/n interbank rate. This shift has already led to several fruitful outcomes, including stabilization of the o/n interest rate; improved correlation between the policy rate and the SBI rate, swap rate, and interbank rate; and, as a consequence, more efficient liquidity management by financial institutions.

4.2 Money market operation tools

Money market operation tools applied by EMEAP central banks vary across the banks, largely reflecting the different degrees of development in domestic markets. Major tools include repos, FX swaps, the issuance of central bank securities, and direct borrowings by central bank. While the RBA, BOJ, BOK and RBNZ accept a wide range of instruments as eligible collateral, other central banks limit eligibility to government securities, quasi-government bonds, and central bank securities (Attachment 3).¹⁶

The small stock of government securities issuance in some EMEAP economies imposes a major constraint on central banks in securing instruments for conducting their market operations. While repo operations are the most widely used market operation tool, they are not the core operation for liquidity management, except in Australia, Japan, and Korea.

In Australia, the government bond market has shrunk, reflecting healthy fiscal conditions since the 1990s, and securing eligible collateral to conduct funds-supplying operations has become an issue for the RBA. The recent global financial crisis also prompted the RBA to accept a wider range of domestic securities as eligible collateral, including those with lower credit standard than government debt, and it has since then increased reliance on bank bills.

¹⁶ The BOK decided to accept financial debentures, some government agency-issued bonds, and Korean Housing Finance Corporation MBS, as a temporary measure, effective from November 2008 to November 2009.



In similar circumstances to Australia, the RBNZ initially opted to increase reliance on FX swap and basis swap operations, which are secured by foreign currency, instead of increasing reliance on domestic securities. However, in November 2008, the RBNZ introduced a temporary Term Auction Facility (TAF) using reverse repo secured by a range of collateral, including bank securities. The TAF offers maturity dates up to 12 months, and the RBNZ has injected a large proportion of settlement cash via this method to support banking system liquidity (the RBNZ issued Reserve Bank bills to partially sterilize the cash injected via the TAF).¹⁷ FX swap operations are, nevertheless, still widely used in EMEAP economies. The RBA, BI, BNM, BSP, MAS, and BOT use them as a significant supplementary tool.¹⁸ ¹⁹ While the BOK does not regularly use FX swaps as a means for its market operations, they were widely used to provide USD liquidity in the market to facilitate banks' USD funding during the peak period of the crisis in late 2008.

Another important feature of EMEAP central banks' market operations is the high issuance of central bank securities (PBC, BI, BOK, BNM, and BOT), because there are a number of central banks whose major challenge has been to mop up excess liquidity from the money markets.²⁰ While this is a very useful tool for central banks, in that it can be used flexibly, it can aggravate the soundness of a central bank's balance sheet if used excessively, because of the associated interest payment burden. For instance, the BOK had been in deficit from 2004 to 2007, owing to its heavy interest payment burden on the Monetary Stabilization Bond, central bank bill, and foreign exchange revaluation losses arising from foreign reserves. The BOT also faced a similar challenge. The BSP, meanwhile, is prohibited under its central bank law, from issuing its own securities, except in the case of extraordinary movement in price levels. Direct borrowing from the market is another major form of liquidity absorption tool used by some central banks. The BNM's direct borrowing amounted to over half of its total fund absorbing operations in the monthly average for January - September 2009.

All central banks in the region have introduced standing facilities that are accessible by financial institutions on their own initiative. They are currently mainly used to provide liquidity for transitional needs in many economies. Standing facilities are no longer used as a policy signal per se in most economies, but are mainly used as a supporting device to help keep short-term market interest rates in line with the formal policy signal. Market interest rates are defined by a corridor structure

¹⁷ Both the TAF and a regular weekly Reserve Bank bill tender were introduced as temporary measures, and removed in November 2009.

¹⁸ BI introduced FX swaps as its liquidity management tool in 2005 with maximum tenure of 7 days, which was later extended to 1 month in mid-October 2008, aiming to enhance its capacity to provide sufficient liquidity. However, BI has not conducted this operation so far.

¹⁹ While FX swaps are considered an operational tool in draining out excess liquidity in the market, the reverse repurchase (RRP) rate remains the BSP's main policy tool to communicate monetary policy stance.

²⁰ The RBNZ announced in November 2008 that it would hold a weekly Reserve Bank bill tender to withdraw cash from the banking system to sterilize the cash injected via the TAF, whose introduction was announced at the same time.



derived from either standing facilities or the interest rate paid on reserve requirements (Attachments 2 and 4). In some member economies, including the Philippines, standing facilities are used to indicate the formal policy rates.

4.3 Access to central bank money and the issue of stigma

Access to central banks' money

The survey conducted by the WGFM shows that most major financial institutions in EMEAP member economies, including foreign banks' branches, have access to central bank money, for both market operations and standing facilities (Attachment 5).

In most EMEAP economies, eligibility criteria for becoming a counterparty in the central bank's market operations are clearly stipulated. Criteria include i) sufficient market-making performance, ii) credit worthiness, and iii) access to the nationwide settlement system. The number of counterparties is usually limited to a pre-determined number for purposes of operational efficiency. According to the survey, there is no discriminatory treatment against foreign banks, and access to standing facilities in most EMEAP economies is granted to virtually all financial institutions that meet certain prudential requirements and that have eligible collateral to pledge, including branches of foreign banks.

On the other hand, in China, foreign banks do not have sufficient access to the PBC's standing facilities, and there have been increasing calls from foreign banks for them to be granted access to these facilities.²¹ Where offshore borrowing is restricted and the function of local money markets in redistributing reserve balances is relatively underdeveloped, the lack of access to the central bank's standing facilities might well spark significant concerns over financial institutions' liquidity management.

Stigma

While standing facilities are an effective tool as a back-up resource for central banks' liquidity management, stigma has reduced their effectiveness in the US and some European money markets, especially under stress situations. Addressing the issue of stigma is therefore important for reducing liquidity risk in the financial system. Most EMEAP central banks reported that stigma problems were not observed in their respective money markets (RBA, HKMA, BI, BOJ, BSP, MAS, and BOT), while some reported minor instances of stigma (BOK and RBNZ).

Stigma has increased volatility in the o/n interest rate in Korea. The BOK introduced its standing facility in March 2008, and stigma was observed in the period between May 2008 and early 2009,

²¹ While a short-term auction instrument, i.e., Term Auction Facility (TAF), can be used at the request of eligible banks, including foreign banks' branches, there are only two foreign banks (HSBC and Standard Chartered) that are accepted as eligible counterparties to meet the criteria for other PBC operations.



when credit and liquidity risk concerns over Korean banks increased among market participants. Banks responded by conducting prudent liquidity management, and began to front-load the reserve requirements to avoid tapping on the BOK's standing facility.

The absence of stigma in many EMEAP money markets can be attributed partly to the peculiar environment, where i) central banks have undertaken the role of central counterparty and are not necessarily perceived as the "last resort," and where ii) interbank transactions are not active as observed in repo markets, and market participants do not have to be concerned about counterparty credit risk.²²

The CGFS report suggested some measures for addressing the issue of stigma, including, i) market education regarding the objectives of standing facilities, ii) enhancing disclosure regarding financial institutions' soundness, and iii) ensuring confidentiality regarding the use of standing facilities. Most EMEAP central banks concurred with the importance of confidentiality. The BSP and MAS are keeping information on standing facility lending confidential, and the BOJ and RBNZ publish only aggregated amounts of their use, while the names of financial institutions and securities provided are kept confidential.

4.4 How to cope with possible market stress situations

Most EMEAP central banks are confident that their liquidity management frameworks are sufficient to cope with possible stress situations in their money markets, and their frameworks have been further strengthened by measures introduced to cope with the recent global financial crisis.

However, since many central banks usually operate under circumstances of excess liquidity, coping with a liquidity shortage has posed a new challenge for them, particularly regarding the effectiveness of their market operations under a liquidity squeeze.

Expansion of eligible collateral for open market operations

In case the current list of central bank's liquidity measures proves to be insufficient, extending the list of eligible collateral and expanding eligible counterparties for the central bank's liquidity management would be effective. Most EMEAP central banks have discretion to expand their list of eligible collateral where necessary, and can cope promptly with stress situations. Some members have in fact responded to the recent crisis by expanding their eligible collateral to include lower credit quality instruments for the effective provision of liquidity in the market.²³

²² In Malaysia, the absence of stigma was also attributable to the communication strategy that makes clear to financial institutions that the use of standing facilities is for the management of unexpected "frictional" payment shocks and acts as a safety valve mechanism for liquidity management.

²³ Lack of domestic currency-denominated high-quality financial assets in some economies was part of the reason some central banks expanded the criteria for eligible collateral to lower credit quality



Since the recent crisis began in mid-2007, six member central banks - the RBA, BI, BOJ, BOK, RBNZ, and BOT - have expanded the range of eligible collateral to increase their ability to provide liquidity. The RBA eased conditions to accept ABCP and RMBS as eligible collateral, increased its reliance on bank bills, and reduced the use of general collateral (GC) such as government bonds. This was aimed both at enhancing the RBA's capacity to provide liquidity to the market, and at facilitating collateral management for financial institutions. Indeed, bank bills were the most suitable instrument available to affect the 3-6 month zone of the yield curve, in which significant increases in funding cost had been observed. The composition of collateral for the RBA's operations therefore changed drastically over the 2007-2009 period. GC, which once represented half of total collateral, declined sharply. Instead, bank bills and RMBS increased to represent over 70 percent and slightly less than 20 percent, respectively, in late 2008 before declining steadily through 2009 as market liquidity conditions improved (Attachment 3). The RBA considers that risk is managed appropriately by accepting these instruments not through outright transactions but through repo, and by applying appropriate haircuts. The RBA's use of FX swaps to manage domestic liquidity was also run down through this period. The main reason for this was the decline in government deposits held at the RBA, though an additional factor was a shift in open market operations away from FX swaps, given the tight liquidity conditions in the USD market, and toward providing liquidity through repos.²⁴

Meanwhile, the RBNZ added AAA- and AA-rated corporate, local authority and state-owned enterprise securities, AAA-rated RMBS, as well as bank CDs for all registered banks as eligible collateral for its repo operations, and became more active in repo operations in late 2008. In December 2008, it also offered to accept AAA/A-1+ ABS as eligible collateral, and reduced the short- and long-term credit criteria on bank, local authority, state-owned enterprise and corporate securities to A2/BBB-, respectively. The BOK also announced temporary measures, for one year starting from early November 2008, to accept bank debentures and some government agency securities, including MBS, which are issued by the Korea Housing Finance Corporation.²⁵ BI has also expanded its eligible collateral to include government securities, in addition to SBIs.

The BOJ did not have to expand its list in the initial stages of the turmoil since it already had a sufficient range of instruments to cope with the situation, these instruments having been expanded during the period of the "zero interest rate policy" and "quantitative easing policy." In mid-October 2008, in response to increasing strains in the market, the BOJ decided to expand its eligible collateral for JGB repo operations to include floating rate instruments, inflation-indexed bonds, and 30-year

instruments.

²⁴ See the RBA Bulletin for further

details. <http://www.rba.gov.au/publications/smp/boxes/2008/feb/a.pdf>

²⁵ The BOK explains that these measures were not in response to difficulties in the Korean commercial banking sector, but rather to restore the interplay of supply and demand in the debt securities markets. The measures were removed effective from November 7, 2009, as was initially planned.



JGBs, to improve liquidity in the repo market. With a view to further facilitating its money market operations, the BOJ announced an expansion of eligible collateral for its provision of credit. The BOJ decided to accept debt instruments issued by estate investment corporations, government-guaranteed dematerialized CP, and bonds issued by the governments of the US, UK, Germany and France, and a wider range of loans on deeds extended by financial institutions to the public sector. As a temporary measure, it also broadened the range of ABCPs eligible as collateral for the Bank's provision of credit by accepting debt obligations guaranteed by the BOJ's counterparty financial institutions. Regarding the treatment of corporate debt as eligible collateral, the BOJ eased the criteria on credit ratings from A-rated or higher to BBB-rated or higher in December 2008.

Meanwhile, the BOT can expand the list of eligible collateral in case of emergency needs. To provide guidelines for preparation on the part of financial institutions, the BOT communicated with eligible counterparties regarding contingency plans for liquidity support during stressed conditions.

Extending FX swap operations

Central banks in those economies where the stock of high-quality financial assets is insufficient might also respond by relying more on FX swaps, which are another form of secured transaction. The scope for their use is expected to widen, as they provide a convenient tool that can be used against currencies other than the USD, when necessary and feasible. For instance, BI has lengthened the tenure of its FX swap operations from up to 7 days, to up to 1 month, to enhance its flexibility to cope with tightening in the money market. Likewise, in October 2008, the HKMA began to conduct FX swap transactions on demand from any licensed bank when the HKMA considers the request necessary, as a temporary measure to address individual bank's HKD liquidity management. Following expiry of this temporary measure on 31 March 2009, the HKMA has decided to incorporate FX swaps into its ongoing market operations to offer HKD liquidity assistance to banks, if needed, on a case-by-case basis.

The remaining challenges are Herstatt risk, credit risk of clearing financial institutions, and market size and liquidity. For example, the BOK considers that the FX swap market is not large enough to be used for Korean won liquidity provision. The BNM considers that the FX swap market is not a main tool to supply domestic currency liquidity in a crisis situation. According to their observations from the Asian crisis in the late 1990s, liquidity shocks in both the ringgit and USD liquidity markets tend to occur simultaneously for Malaysian financial institutions. The BSP explained that the number of financial institutions with abundant USD liquidity is limited in the Philippines, and so the BSP cannot necessarily reach financial institutions in need of peso liquidity by means of FX swap operations.

On the other hand, in the recent global financial crisis, FX swap operations have proved to be a very



effective tool for supplying USD liquidity when financial institutions are faced with tight USD funding. The RBA, BOK, and BOT have actively resorted to this measure to ease USD liquidity shortages in the money markets. In particular, the BOK has expanded the range of counterparties for its FX swap operations, which were formerly restricted to some agent institutions, to include all foreign exchange banks. In addition, it was also announced that banks' foreign exchange transactions would be given government guarantee up to USD 100 billion to facilitate banks' USD funding. The MAS has the flexibility to widen the scope of its standing facility, including to other instruments such as FX swaps, in the event of a severe liquidity shortage.

Enhancing access to standing facilities

Enhancing access to standing facilities is also very important, so that financial institutions facing liquidity difficulties in times of market stress can borrow directly from a central bank. While few EMEAP members observed stigma in their respective markets, the stigma observed in Korea might be a reflection of the higher strains in Korean money markets than in other EMEAP economies. Measures to enhance access to standing facilities were taken in some economies.

BI added government securities as eligible collateral for its standing facilities, in line with its treatment in market operations, and, also narrowed the interest rate corridor applied to its standing repo facility from 800 bps to 600 bps in April 2008 as part of its plan to improve the effectiveness of its liquidity management practice. In September 2008, it narrowed the corridor further to 200 bps to facilitate access to the standing facility. This was followed by lengthening of its tenure from o/n to up to 3 months. In addition, to enhance its role as lender of last resort, BI added certain types of corporate bonds and consumer loans with current status, as eligible collateral for its Short Term Funding Facility.

Likewise, the HKMA decided at the end of September 2008 to accept US Treasuries as eligible collateral for its standing facility (namely, the Discount Window), to extend the term of lending to three months, and to waive the penalty rate for using over 50 percent of Exchange Fund paper holding in accessing its standing facility. In early October 2008, it also changed the method used to calculate the base rate applicable to its standing facility from "the higher of (a) FF rate plus 150 bps, or (b) the average of the 5-day moving averages of the o/n and 1-month HIBORs" to "FF rate plus 50 bps", to facilitate financial institutions' access to the standing facility in the face of tightening HKD liquidity in the domestic market. These measures were effective for six months until the end of March 2009. Following the expiry of these temporary measures, the HKMA decided to resume the previous arrangements for accessing the Discount Window (namely, using only Exchange Fund paper for o/n repo). For the calculation of the Base Rate, the smaller spread of 50 bps was retained but the HIBOR leg (i.e., the average of the 5-day moving averages of the o/n and 1-month HIBORs) was reinstated to allow the interest rate adjustment mechanism to function under the Currency Board system as



necessary.

The BSP also announced in mid-October 2008 the expansion of eligible collateral for its standing repo facility to include foreign currency-denominated sovereign debt securities of the Philippines (ROP).

In July 2008, the MAS announced an expansion of the counterparties for its standing facilities from 11 primary dealers to all Singapore dollar RTGS system participants, to improve the effective reach of its liquidity management framework. To further enhance the resilience of the financial markets, the MAS announced on 16 July 2009 that it would expand the list of eligible collateral in the standing facility to include AAA-rated S\$ debt securities issued by supnationals, sovereigns, and sovereign-backed companies, as well as foreign currencies and government debt securities where they have entered into cross-border collateral arrangements with the corresponding central banks.

Other measures taken by EMEAP central banks

The HKMA announced at the end of September 2008 that, in response to requests from individual licensed banks and when it considers necessary, it would lend term money of up to three months to individual licensed banks against collateral of credit quality acceptable to the HKMA. This temporary measure was aimed at easing term funding pressures and providing assurances to banks of the availability of liquidity. Interest rates were determined with reference to market interest rates for collateralized lending, while haircuts were applied according to the types of collateral. With the expiry of this measure at the end of March 2009, the HKMA decided to incorporate this term lending measure into ongoing market operations to offer HKD liquidity assistance to banks, if needed, on a case-by-case basis.

The RBNZ introduced an exchange settlement account tiering regime to encourage redistribution of liquidity among market participants. Under this regime, each account holder with the RBNZ is assigned a tier, based on their payment flows and the size of their balance sheet. The RBNZ remunerates their balance up to their tier at the policy rate, but at the policy rate less 100 bps for balances in excess of their tier. Tiering has so far been relatively effective at encouraging banks to redistribute liquidity.

The BOJ announced the introduction of its Special Funds-supplying Operations to Facilitate Corporate Financing in December 2008, through which unlimited term funds were provided against corporate debt collateral at the fixed rate of o/n policy rate.²⁶ The BOJ stepped up unconventional

²⁶ The operations were further enhanced in February 2009 by standardizing the duration of all such loans to three months and increasing the frequency of operations, which remained in effect until the end of March 2010. Since April 2010, the BOJ has been prepared to provide ample liquidity mainly through funds-supplying operations against pooled collateral, with a wider range of collateral being



measures in January and March 2009, by beginning the outright purchase of CP and corporate bonds with a residual maturity of up to one year.²⁷

Some EMEAP central banks have introduced new measures to assist USD liquidity. For instance, the BOJ introduced USD operations in mid-September 2008 as a temporary measure, which can be provided against pooled collateral for the BOJ's regular market operations. Similarly, the BSP announced the opening of a USD repo facility in mid-October 2008, to augment USD liquidity in the market and to help address temporary market tightness. This USD repo facility is accessible with ROPs as eligible collateral.

5. Possible EMEAP cooperation

The CGFS report pointed out that in a situation where efficient international liquidity redistribution is impaired, international central bank cooperation can supplement this function by means of swap arrangements among central banks and the introduction of cross-border collateral. This section discusses the prospects for regional cooperation among EMEAP central banks, drawing on the findings of the CGFS report.

5.1 Possible options suggested by the CGFS report

The CGFS report identified three possible forms of regional cooperation among central banks to counter market stress situations: i) enhanced communication and information sharing, ii) swap arrangements among central banks, and iii) cross-border collateral.

First, a framework must be established to monitor the funding problems of internationally active banks through close monitoring and information sharing with the relevant authorities. Timely and accurate information exchange among related authorities could help prevent a local liquidity shock spreading internationally, owing to credit risk concerns stemming from information asymmetry with respect to a financial institution's monetary situation.

Second, the recent global financial crisis has shown that FX swaps among authorities can be useful instruments for central banks in granting foreign currency liquidity to those banks facing difficulties in funding. This can also leave the decision to lend to the parent bank of the troubled affiliate with the home central bank, which should have the most accurate information on the borrowing bank's funding conditions.

Third, another option for central banks to allow banks to mobilize liquidity across borders is for them

accepted.

²⁷ These measures were terminated at the end of December 2009.



to agree to accept foreign currency-denominated assets or obligations booked abroad as eligible collateral.²⁸ This could enhance liquidity management for banks operating internationally.

It should be noted that FX swap arrangements among central banks and cross-border collateral are not substitutes but rather supplementary to each other. While FX swap arrangements among central banks are useful in emergency situations, cross-border collateral can also be used in normal times, but its introduction requires discussion and consideration of many more technical issues. For instance, an FX swap arrangement can be concluded and activated among central banks without involving additional parties, and can be settled without major changes or additional measures, and thereby, can be introduced relatively swiftly.

On the other hand, cross-border collateral has merits in expanding the scope of eligible collateral with high credit standard for central banks, and possibly mitigating any adverse impact on the pricing of domestic securities markets caused by fluctuations in collateral demand, especially in an economy with relatively underdeveloped securities markets. However, there could be high transaction costs, such as i) coordination among many related parties, including custodians, ii) complicated legal issues regarding contracts and jurisdictions, iii) high administrative costs regarding risk management, including marking to market and haircuts, and last but not least, iv) difficulty of managing settlement risk owing to time differences. Therefore, the introduction of cross-border collateral would require careful assessment of the necessary infrastructure, including a settlement system that would allow collateral to be transferred between custodians and central banks swiftly with low transaction costs, as well as an assessment of the legal environment in which central banks' operations are defined. Such assessments would require significant expenditure in terms of both time and human resources.

5.2 Possible cooperation among EMEAP central banks

Information exchange

The special workshop in August 2008 recognized the importance of enhanced collective regional surveillance and information exchange. The regular and frequent exchange of information is essential to establish a human network and mutual trust to secure smooth and frank communication at times of stress. Following the concerted action by five major central banks in September 2008 to conclude swap arrangements with the FRB, some EMEAP central banks also concluded swap arrangements with the FRB, which was the fruit of close collaboration among colleagues who are regularly participating in the joint meetings among EMEAP and other major central banks.

EMEAP has been continuously enhancing information exchange, surveillance, and collaboration

²⁸ While there is no established definition for cross-border collateral, this report follows the definition accepted by the CGFS, which includes i) foreign currency-denominated securities or currency, ii) securities issued abroad, and iii) securities held or booked abroad.



among members at every level of its main three-tier governance structure. EMEAP established the Monetary and Financial Stability Committee (MFSC) in 2007 to enhance regional collaboration and cooperation in the area of macro-monitoring and crisis management. EMEAP also introduced a platform under the WGFM to exchange timely information and conduct surveillance activities on a regular and more frequent basis. Moreover, EMEAP enhanced its framework to facilitate information exchange, interaction, and cooperation among its members during the recent crisis.

In addition to examining these frameworks, EMEAP conducts topical studies and holds workshops in a timely and flexible manner. The special workshop held in August 2008, just before the Lehman Brothers bankruptcy, was a valuable opportunity for experts in liquidity management from EMEAP central banks to get together. It is important to build on this relationship and create similar opportunities to develop face-to-face relationships among money market experts.

Swap arrangements among central banks

Participants in the special workshop in August 2008 noted that there was no pressing need for swap arrangements among member central banks, since i) many central banks from the region had abundant foreign reserves, and ii) foreign banks' cross-border activities in the region were rather limited, especially for financial institutions from the region, and thus, the potential for liquidity problems arising from these financial institutions was deemed low.²⁹ Nonetheless, it was noted that foreign exchange swap lines had been useful in alleviating foreign currency funding pressures globally during the financial crisis.

Indeed, after the Lehman Brothers bankruptcy, counterparty credit risk rose sharply, and USD liquidity tightness was observed even in the EMEAP region. This triggered demand for USD FX swap arrangements as a means to secure USD funding, and some central banks took action in this regard.

In mid-September 2008, the BOJ decided to establish an FX swap arrangement with the FRB, and introduce USD funds-supplying operations as part of the coordinated measures of central banks in major economies. This action was designed to address the continued elevated pressures in USD short-term funding markets. Limits on the amount for the FX swap arrangements with the FRB by the major central banks, including the BOJ, were later removed to prevent further expansion of the crisis, and it became possible for each central bank to provide USD liquidity without limit. In late September 2008, the RBA concluded an FX swap arrangement with the FRB along with three Nordic central banks, and in late October 2008, the RBNZ, BOK and MAS also concluded swap arrangements with the FRB, to secure USD funding for USD supply operations in their domestic markets. These measures were

²⁹ Economies where branches of EMEAP banks represent more than five percent of total banking sector assets are Hong Kong, Singapore, New Zealand, and Thailand. Banks with a relatively large presence in EMEAP economies are those from Australia, China, Hong Kong, Japan, and Singapore.



effective in maintaining the smooth functioning of domestic and international financial markets.³⁰

Increasing concern over counterparty credit risk also had a negative effect on foreign banks' local currency funding. Although the cross-presence of regional financial institutions is limited, swap arrangements for local currency is a possible option in money markets where financial institutions from the region are active, so that the home central banks can assist financial institutions' liquidity management in the local currency.

It is also worth noting that the Chiang Mai Initiative Multilateralization (CMIM) has been established by the ASEAN+3 finance ministries and central banks as a USD 120 billion facility to address balance of payments and short-term liquidity difficulties in the region, and to supplement the existing international financial arrangements. The CMIM will provide financial support through currency swap arrangements in times of liquidity need. The CMIM Agreement was signed on December 24, 2009 and, took effect on March 24, 2010.

Cross-border collateral

This is an attractive option for some EMEAP economies, given that the outstanding stock of low-risk assets denominated in local currency is relatively limited.

Some central banks from the region have already begun accepting foreign currency-denominated securities or have begun practical considerations, including how to mitigate settlement risk owing to time differences and what would be the appropriate level of haircut. As a temporary measure effective until March 2009, the HKMA began accepting US Treasuries as collateral for its Discount Window lending at the end of September 2008. With the stabilization of local interbank money markets, this measure was allowed to lapse and the previous arrangement of only accepting Exchange Fund paper as collateral was resumed. The BSP announced the acceptance of foreign currency-denominated sovereign debt securities as eligible collateral for its standing peso repo facility and newly introduced USD repo facility. The MAS has entered into a cross-border collateral arrangement with DeNederlandsche Bank, and will be concluding similar arrangement with other central banks. On May 22, 2009, the BOJ announced the introduction of a CBCA for its operations. Application of the Collateral Guideline on Eligible Foreign Bonds was commenced on July 31, 2009. Eligible foreign bonds should secure any and all obligations arising from the overdrafts, bilateral electronic lending, fund-supplying operations against pooled collateral, agency agreements, revenue agency agreements, US dollar funds-supply operations against pooled collateral, and special funds-supplying operations to facilitate corporate financing. The BOT can also expand the list of eligible collateral in emergency situations to include cross-border collaterals.

³⁰ The RBNZ and MAS have not utilized this facility.



However, the introduction of cross-border collateral facilities requires careful preparation, including i) necessary discussion on settlement risk, legal aspects, and other practical issues associated with their implementation, and ii) introduction of the risk management framework necessary to manage interest rate risk and foreign exchange risk appropriately.

The RBNZ discussed accepting foreign currency-denominated securities, but was discouraged from doing so because of technical difficulties associated with its introduction as mentioned above, and also because local banks do not hold large inventories of foreign securities.

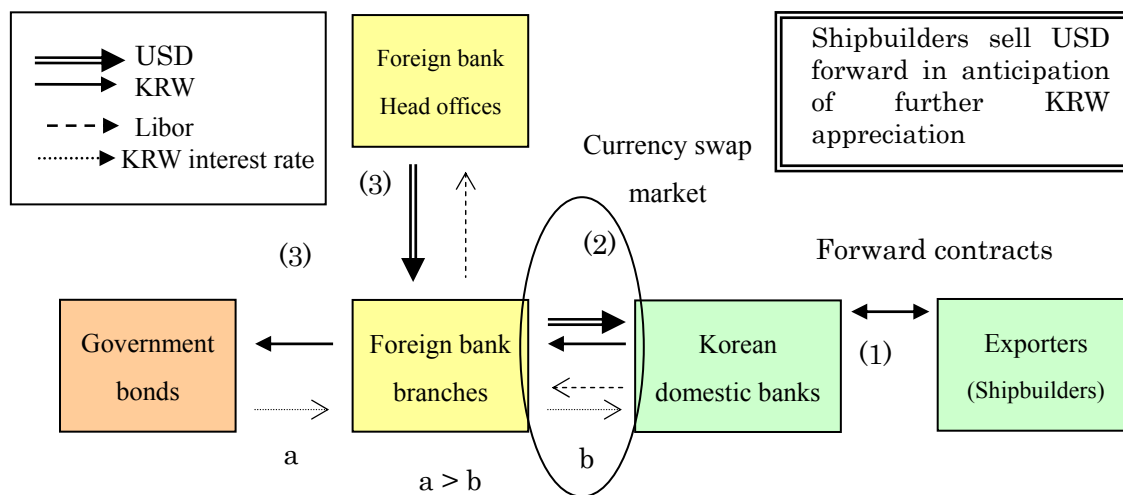
Central banks in the region entered into cross-border collateral arrangements during and after the recent crisis to strengthen liquidity arrangements for global banks. These existing and on-going efforts regarding cross-border collateral could develop into a substantial set of “best practices” or lessons that other central banks in the region could draw on.

* * *



BOX 1. Arbitrage transactions by foreign banks' branches in Korea

During the prolonged period of KRW appreciation, the high demand for hedging foreign exchange risk by exporters and individual investors lowered currency swap rates to yield arbitrage opportunities against the government bond rate. Foreign banks' branches were motivated to take advantage of this arbitrage opportunity, and increased offshore borrowing from their head offices and purchased government securities in tandem. The tightening of USD funding, however, appears to have caused the unwinding of these positions.



(1) Exporters, including shipbuilders, sell USD forward to domestic banks to hedge foreign exchange risk of USD denominated export proceeds, in anticipation of further KRW appreciation.

(2) Domestic banks commit in currency swap contracts with foreign bank branches in order to hedge the forward contracts with shipbuilders.

— Domestic banks receive USD spot and pay USD at maturity, while receiving KRW fixed interest rate, and pay USD Libor to foreign bank branches during the contracted period.

— Increased demand for currency swap contracts from domestic banks resulted in a reduction of KRW fixed interest rate paid by foreign bank branches (currency swap rate) to below the government bond yield. This provided a risk-free arbitrage opportunity for foreign bank branches by investment in government bonds. It appears that the regulatory gap on offshore borrowing for domestic banks and for foreign banks has caused high demand for currency swap transactions by domestic banks, and thus, distortion in interest rates.

(3) Foreign bank branches borrow USD from their head offices at Libor, and provide them to domestic banks in exchange for KRW, which will be invested in government bonds. As a result of this arbitrage transaction, USD offshore borrowing, and investments in government securities by foreign banks, increased.



BOX 2. Liquidity management for Islamic banking in Malaysia

Islamic banking has grown rapidly in Malaysia in recent years, with 20 percent growth every year. As of September 2009, it represented 19 percent of banking sector assets and about 21 percent of banking system surplus liquidity, with outstanding Islamic *sukuks* (broadly speaking, Islamic debt securities) accounting for about 58 percent of outstanding conventional (interest-bearing) debt securities.

The underlying principles of Islamic finance include i) interest free, and returns are profits derived from a trade transaction, lease rentals, or fees for services rendered on non-contractual payments, ii) free from elements of uncertainty and gambling, and iii) financing cannot be used for activities contrary to the teachings of Islam, including gambling, alcohol, or environmentally damaging industries.

Since the main objectives are different for conventional banks and Islamic banks, redistribution of reserve balances are not conducted directly between these two sectors. Instead, the BNM is acting to channel these two sectors by conducting different types of market operations, respectively. With the conventional banking sector, it manages liquidity to achieve the target level of the overnight policy rate (OPR), while with the Islamic banking sector, liquidity management is conducted to ensure sufficient liquidity for the market to clear payments and settlements, with no reference to any targeted rate of return.

The BNM is also equipped with standing facilities as back-up facilities for its liquidity management, and while they are available to the conventional banking sector through lending and deposit facilities, they are also available to the Islamic banking sector, through Shariah-compliant instruments.

The Islamic indicative rate of returns for interbank transactions, determined on the basis of agreed profit-sharing ratios, has followed the policy rate closely, with a slight time lag and at a slightly lower level. It is considered that competition for financing causes the Islamic market to adjust its profit-sharing ratio in order to remain competitive and converge with the policy rate level.

Islamic banks tend to hold more liquidity to offset liquidity risk arising from the low liquidity profile of their assets, which are associated with Islamic business models, such as leasing. And this would partly explain why the rate of return of the Islamic banking sector is following that of the conventional banking sector.

Structure of banking systems in EMEAP economies

	RBA	PBC	HKMA	BI	BOJ	BOK	BNM	RBNZ	BSP	MAS	BOT
Number of banks	58	441	200	121	208	56	57	19	797	117	32
Domestic banks	23	227	65	111	149	18	55	9	783	8	17
o/w subsidiaries of foreign banks	9	n.a.	46	16	6	3	20	6	3	2	1
Branches of foreign banks	35	214	135	10	59	38	2	10	14	109	15
Banking sector total assets/GDP (%)	196.1	209.3	639.5	48.2	163.3	193.8	185.6	211.6	79.1	645.7	111.4
Domestic banks/GDP (%)	174.2	184.7	361.1	43.9	156.6	170.8	185.6	184.4	71.5	199.0	96.9
o/w subsidiaries/GDP(%)	8.5	n.a.	166.8	2.6	1.1	22.4	40.4	174.7	0.7	20.8	0.2
Branches of foreign banks/GDP (%)	21.9	3.9	278.3	4.3	6.6	23.0	0.0	27.2	7.6	446.7	14.5
Foreign bank subsidiaries' presence in banking sector in terms of asset size (%) (a)	4.3		27.0	5.3	0.7	11.5	21.8	82.6	0.8	3.2	0.1
Foreign banks' presence in banking sector in terms of asset size (%) (b)	11.2	1.9	42.8	8.9	4.1	11.9	0.0	12.8	9.6	69.2	13.0
o/w EMEAP banks' presence (%)	2.0	n.a.	12.4	3.3	0.4	n.a.	0.0	9.4	3.7	17.8	6.3
(a) + (b) (%)	15.5	1.9	69.8	14.3	4.7	23.4	21.8	95.4	10.5	72.4	13.2

Note: 1. "n.a." stands for "not available".

2. All banking data are as of end of September 2009, except for China. 2006 data for China.

3. General definitions for banks are as follows.

Total banks	Banks head offices, branches and subsidiaries located in reporting country
Domestic banks	Banks whose head offices are located inside the reporting country.
o/w foreign bank subsidiaries	Separate incorporated entities located in reporting country in which another entity (i.e., foreign banks) has a majority or full participation.
Foreign banks	Banks whose head offices are outside the country in which the bank is located.

4. Subsidiaries of foreign banks in Indonesia are the joint venture between Indonesian citizens and/or an Indonesian legal entity with foreign citizens and/or a foreign legal entity.

5. Branches of foreign banks in Malaysia were established as International Islamic Banks under the Malaysia International Islamic Financial Centre (MIFC) initiative and are only allowed to transact in foreign currencies.

Source: National Data, International Financial Statistics, IMF.

Monetary policy frameworks of EMEAP central banks

(as of end of February 2010)

	RBA	PBC	HKMA	BI	BOJ	BOK	BNM	RBNZ	BSP	MAS	BOT
Key policy rate	Uncollateralized o/n interbank rate	1 year deposit and lending rate	HKD 7.8=USD1	BI rate	Uncollateralized o/n interbank rate	7-day repo rate	O/n Policy Rate (uncollateralized o/n interbank rate)	Official cash rate	O/n reverse repo & repo rate	Trade weighted exchange rate	1-day repo rate
Operating target	Uncollateralized o/n interbank rate	Excess reserves (+money market rates as references)	Spot exchange rate	O/n interbank call rate	Uncollateralized o/n interbank rate	7-day repo rate	Uncollateralized o/n rate (\pm 25bps)	Official cash rate	No formal target. BSP sets policy rates	\$\$NEER	1-day repo rate
Standing facilities	Repo, Set at 25bps above the policy rate	Lending and deposit (excess reserve deposit)	Repo, Set at the Base Rate, which is currently set at FF rate+50 bps or the average of the 5-day moving averages of the overnight and 1-month HIBORs, whichever is higher	Lending/borrowing, with 100bps corridor	Complementary lending facility & complementary deposit facility (temporary measures for Nov '08-Jan '10), with 20bps corridor ¹	Liquidity adjustment loan & deposit, with 200bps corridor	Lending/borrowing, with 50bps corridor	Overnight Reverse Repo Facility loan, o/n deposits, with 50bps corridor	Repo/reverse repo, rediscounting, special deposit account, special credit operations, emergency loans	Deposit and Collateralized lending, with 100 bps corridor	End-of-day Liquidity Adjustment Window (FIs may lend or borrow o/n with collateral), with 50bps corridor
Reserve requirement	None	Yes	None	Yes	Yes	Yes	Yes	None	Yes	Yes	Yes
Remuneration	Not Applicable	Yes (1.62%)	Not Applicable	No	No	No	No	Not Applicable	Yes (4% for up to 40% of statutory reserve requirement) ²	No	No
Remuneration of excess reserve	Not Applicable	Yes (0.72%)	Not Applicable	No	Yes (0.1% as the complementary deposit facility)	No	No	Not Applicable	No	No	No

1. Basic loan rate applicable under complementary lending facility is 0.3%, while interest rate applied to the complementary deposit facility is 0.1%.

2. The liquidity reserve requirement consisted of market-yielding government securities purchased directly from the BSP, and the liquidity reserves were paid the rate on comparable government securities less half a percentage point. However, in March 2006, the Monetary Board began to require banks to keep liquidity reserves in the form of term deposits in the reserve deposit account (RDA) with the BSP instead of government securities bought directly from the BSP. The RDA, which eventually replaced government securities as a form of compliance with the liquidity reserves, allows banks to keep a portion of their reserves in the form of three-month term deposits. The Treasury Department also has the option of offering RDA with 6 and 12 month tenors, with interest rate at one-half percent below the prevailing market rate for comparable government securities. Pre-termination of RDAs is allowed, subject to a reduction in applicable interest rates, as prescribed by the Treasury Department.

Market operational tools used by EMEAP central banks (Jan – Sep 2009)

	RBA	PBC	HKMA	BI	BOJ	BOK	BNM	RBNZ	BSP	MAS ⁸	BOT
Outright sales/ purchases	○ (7%)		not applicable	○ (0%)	○ (20%)	○		○ (0%)			○ (10%) ¹⁰
Repos/reverse repos	○ (83%)	○ (10%)	not applicable	○ (2%)	○ (80%) ⁴	○ (10%)	○ (8%)	○ (36%)		○ (0%)	○ (25%)
Issuance of CB securities		○ (90%)	not applicable	○ (81%)	○ (0%)	○ (90%)	○ (19%)	○ (16%)			○ (47%)
FX swaps	○ (8%)		not applicable	○ (0%)			○ (0.1%)	○ (48%) ⁷	○ (100%)	○ (59%)	○ (8%)
Others	○ (2%) ²		not applicable	○ (18%) ³	○ ⁵		○ (73%) ⁶			○ (41%) ⁹	○ (11%) ¹¹

1. The table shows tools for discretionary operations by central banks. Figures in parentheses indicate share of each instrument calculated from the outstanding amount of each type of operation based on national data available for the 9 months average from January to September 2009. Detailed figures were not available for PBC. Items shaded in blue indicate most-used operations. 2. Term deposits held at RBA. 3. Direct placement (uncollateralized). 4. This includes fund supplying operations against pooled collateral (47%), repo operations against individual collateral (20%), and temporary "special funds-supplying operations to facilitate corporate financing (13%)." 5. Provision of USD liquidity against pooled collateral. 6. Direct borrowing (uncollateralized) and Islamic finance operational tools. 7. Includes basis swaps: Floating vs floating. Typically against USD (3M USDLIBOR). 8. 2008/09 fiscal year. 9. Direct borrowing (uncollateralized)/lending (collateralized). 10. Outright purchases of public sector bonds, which are unlike the other listed OMOs, liquidity injection operations. 11. BOT debt securities window which is conducted on an auction basis.

Instruments used in EMEAP central banks' market operations (Jan – Sep 2009)

	RBA	PBC	HKMA	BI	BOJ	BOK	BNM	RBNZ	BSP	MAS	BOT
Government securities	○ (7%)	○ (10%)	not applicable	○ (1%)	○ (33%)	○	○ (8%)	○		○ (100%)	○ (19%) ¹²
Agencies, quasi-gov sec.	○ (10%)		not applicable			○		○			
CB securities		○ (90%)	not applicable	○ (81%)	○ (0%) ⁴	○	○ (19%)	○			○ (72%) ¹³
Bank bills/bank bonds/CDs	○ (18%)		not applicable			○		○			
Supra-nationals	○ (0.6%)		not applicable					○			
MBS/RMBS/ABCPs	○ (55%)		not applicable			○		○			
CPs/bills			not applicable		○ (7%) ⁵						
Corporate bonds	○ (0%)		not applicable		○ (0.3%) ⁶			○ ⁹			
Others	○ (10%) ²		not applicable	○ (18%) ³	○ (60%) ⁷		○ (73%) ⁸	○ ¹⁰	○ (100%) ¹¹		○ (8%) ¹⁴

1. FX intervention is not included. Figures in parenthesis indicate share of each instrument calculated from the outstanding amount of each type of operation, based on national data for the 9 months average from January to September 2009. Detailed figures were not available for PBC and BOK. Items shaded in blue indicate most-used instruments. 2. FX swap operations and Term deposits held at RBA. 3. Direct placement. 4. Outright sales of bills drawn by BOJ. 5. Includes outright purchase of CPs since Feb 2009 as a temporary measure. 6. Includes ABCP as a temporary measure. 7. Includes funds-supplying operations (lending) against pooled collateral (47%) and special funds-supplying operations to facilitate corporate financing (16%, temporary measure). Most funds supplying operations are conducted against pooled collateral of JGBs, FBs and TBs. 8. Includes direct borrowing, FX swaps and Islamic operational instruments. 9. Includes ABS. 10. FX swaps and basis swaps. 11. BSP conducts only FX swaps as CB's discretionary operations, while RP operations are conducted as standing facilities. 12. Government, agencies and quasi-gov securities include the outright purchase of government and state enterprise bonds into BOT portfolio as well as the sale of the same securities in repurchase operations. 13. CB securities include BOT bonds and bills sold outright and in repo operations, as well as the BOT0 eP/N used in repo transactions and the BOT debt securities window. 14. USD FX swaps.

FX swap operations conducted by EMEAP central banks

(as of end of February 2010)

	RBA	BI	BOK	BNM	RBNZ	BSP	MAS	BOT
Which currency?	USD, EUR, JPY	USD	USD	USD	Mainly USD, sometimes AUD, EUR, JPY	USD	USD	USD
Conducting with other currencies?	Possible	Not applicable	Possible	Possible	Possible	Possible	Possible	EUR, GBP, and JPY only in stressed condition ¹
Types of transactions?	Bilateral	Bilateral	Bilateral	Bilateral	Bilateral	Bilateral	Auction	Bilateral and auction

1. The BOT does not currently use other major currencies as collateral in swap transactions.

Eligible collateral for EMEAP central banks' liquidity management

	RBA	PBC		HKMA		BI		BOJ	BOK		BNM		RBNZ		BSP		MAS		BOT⁵
Are eligible collateral common for both OMOs and standing facilities?	Yes	n.a.		No		No		Yes	Yes		No		Yes		No		No		Yes
List of eligible collateral	OMO and S.F.*	OMO	S.F.	OMO	S.F.	OMO	S.F.	OMO and S.F.	OMO	S.F.	OMO	S.F.	OMO	S.F.	OMO	S.F.	OMO	S.F.	OMO and S.F.
Government securities	○	○	n.a.	not applicable	×	○	○	⊙	⊙	○	○	○	○	×	⊙	○	○	⊙	
State-gov, agencies, quasi-gov, gov guaranteed securities.	○	×	n.a.	not applicable	×	×	×	○	○	×	○	○	○	×	○	×	○	○	
Supranational/ foreign gov sec.	○	×	n.a.	not applicable	×	×	×	○	×	×	○	○	○	×	×	×	○	×	
Central bank securities	×	○	n.a.	not applicable	×	⊙	⊙	×	○	⊙	○	○	○	×	×	×	○	○	
Corporate bonds/ bills/ CPs	○	×	n.a.	not applicable	×	×	×	○	×	×	×	○	○	×	○	×	×	×	
Bank bills/ CDs/ bank bonds	⊙	×	n.a.	not applicable	×	×	×	×	×	×	×	○	○	×	×	×	×	×	
ABS/RMBS/ABCPs	○	×	n.a.	not applicable	×	×	×	○	×	×	×	○	○	×	○	×	×	×	
Others	×	×	n.a.	not applicable	⊙ Exchange fund securities ³	×	×	○ Loans on deeds	×	×	×	×	×	×	○ Deeds, Foreign currency deposits	×	×	×	
CBs' discretion for expanding eligible collateral types	RBA has discretion.	n.a.		HKMA has discretion.		BI has discretion.		BOJ has discretion.	BOK has discretion.		BNM has discretion		RBNZ has discretion.		List is defined in the BSP Charter.		MAS has discretion.		List is defined in the BOT Act.

- Note: 1. "S.F." stands for "standing facilities" and "n.a." stands for "not available".
 2. ○ indicates acceptable collateral/instruments, ⊙ indicates most-used collateral/instruments.
 3. With effect from October 2, 2008, until the end of March 2009, the range of eligible securities for accessing Discount Window was expanded to include US Treasury securities.
 4. With effect from November 7, 2008, until November 6, 2009, the range of eligible collateral for open market operations was expanded to include bank debentures and some government agency securities, including MBS, which is issued by Korea Housing Finance Corporation.
 5. In case of emergency need, the BOT has expanded the list of eligible collateral to include (1) riskier investment-grade THB-denominated securities issued by state-owned enterprises, corporations, and financial institutions without government guarantee, and (2) major currency-denominated securities issued by Thai and selected foreign governments (US, Japan, UK, Germany and France).

Selection criteria for becoming counterparties of EMEAP central banks' market operations

(as of end of February 2010)

	RBA	PBC	HKMA	BI	BOJ	BOK	BNM	RBNZ	BSP	MAS	BOT
Eligible counterparties	<ul style="list-style-type: none"> All FIs meeting the criteria. Currently 54 banks. 	<ul style="list-style-type: none"> Primary Dealers (PDs) 	<ul style="list-style-type: none"> All FIs meeting the criteria are eligible to become counterparties of FX intervention. Currently 144 eligible financial institutions. 	<ul style="list-style-type: none"> All banks meeting the criteria. 	<ul style="list-style-type: none"> Selected based on the criteria. Currently ranging from 30 to 163 depending on types of operations. 	<ul style="list-style-type: none"> Selected based on the criteria. Currently, 33 and 25 PDs for repo and MSB operations, respectively. 	<ul style="list-style-type: none"> 12 PDs for conventional BNM notes operations, while additional 6 iPDs are added for Islamic BNM notes operations. For other operations, all FIs meeting the criteria. 	<ul style="list-style-type: none"> Selected based on the criteria. 11 of 18 registered banks and 5 banks based in Sydney. 	<ul style="list-style-type: none"> All FIs meeting the criteria. 	<ul style="list-style-type: none"> 12 PDs of Singapore Government Securities for routine operations. 	<ul style="list-style-type: none"> 11 and 9 PDs are selected for bilateral repo and outright purchases/sales of gov bonds, respectively. For other operations, all FIs meeting the criteria.
Criteria	<ul style="list-style-type: none"> Membership of the Reserve Bank Information and Transfer System. Transaction with the RBA through Austraclear. 	<ul style="list-style-type: none"> Please refer to footnote 2 below. 	<ul style="list-style-type: none"> Licensed Banks 	<ul style="list-style-type: none"> Current accounts with the BI. 	<ul style="list-style-type: none"> Current accounts with the BOJ. Access to BOJ-NET. Credit worthiness. Market presence. 	<ul style="list-style-type: none"> Financial prudence. Market making ability. 	<ul style="list-style-type: none"> All interbank participants regulated by the BNM and operating in local currency business 	<ul style="list-style-type: none"> Credit worthiness. Access to Austraclear. 	<ul style="list-style-type: none"> Accounts with the BSP. 	<ul style="list-style-type: none"> Credit rating. Trading volume. Staff/experience. 	<ul style="list-style-type: none"> (Bilateral repo) Market making ability. Sufficient risk management skills. (Outright transactions) Activities in primary and secondary markets. Sound financial position. (Others) Current accounts with the BOT.
o/w foreign banks	<ul style="list-style-type: none"> Currently, 30 out of 31 branches of foreign banks. 	<ul style="list-style-type: none"> 2 foreign banks (HSBC and Standard Charters) 	<ul style="list-style-type: none"> Currently, there are 144 Licensed Banks in Hong Kong, of which 121 are branches of foreign banks. 	<ul style="list-style-type: none"> All 10 branches of foreign banks. 	<ul style="list-style-type: none"> Currently, ranging from 3 to 25 out of 62 branches of foreign banks and securities houses. 	<ul style="list-style-type: none"> Currently, 5 and 4 out of 38 branches of foreign banks, for repo and MSB operations, respectively. 	<ul style="list-style-type: none"> All 20 subsidiaries are eligible for open market operations. 	<ul style="list-style-type: none"> Of the 11 registered banks, there are 5 branches and 4 subsidiaries of foreign banks. The 5 banks in Sydney are also foreign branches. 	<ul style="list-style-type: none"> All 14 branches of foreign banks. 	<ul style="list-style-type: none"> The foreign bank PDs comprise 9 out of 112 foreign banks. 	<ul style="list-style-type: none"> Number of foreign branches under <ul style="list-style-type: none"> Bilateral repo=1 Outright purchases of gov. bonds=4 For other operations, all 15 branches of foreign banks are eligible.

Note: 1. "n.a." stands for "not available".

2. Criteria for the eligible counterparty in China are as follows: 1) financial institutions approved by the administration and qualified as independent entities; 2) compliance with state law and regulations with regard to the economy and finance, as well as asset-liability ratio management regulations set by the supervisory body; 3) strong capital base, qualified staff members, high-quality operating assets, relatively strong ability to make profit and sound internal management mechanism; 4) ability and willingness to fulfill the duties of primary dealers; 5) fulfillment of any other criteria set by PBC.